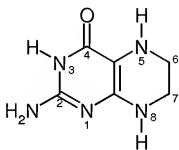


The listing of claims will replace all prior versions, and listings, of claims in the application:

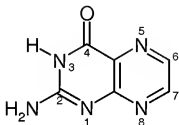
Listing of Claims:

1. (Previously Presented) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium, wherein the catalyst contains a ligand which is (i) triarylphosphine, (ii) tetramethylene phenylphosphine (iii) pentamethylene phenylphosphine, or (iv) a bidentate ligand with a tertiary amine group and a phosphine group or with two tertiary phosphine groups as complexing groups, wherein the bidentate ligands form together with a metal atom a five- to ten membered ring.

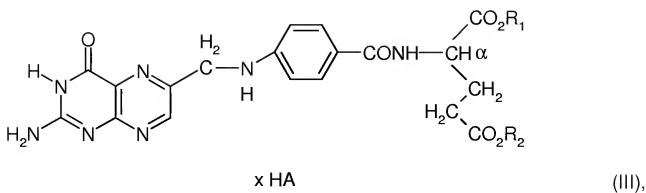
2. (Previously Presented) A process according to claim 1, wherein the polar reaction medium is an aqueous or alcoholic reaction medium.

3. (Previously Presented) A process according to claim 1, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

4. (Previously Presented) A process according to claim 1, wherein the metal complex contains a chiral ligand.

5. (Previously Presented) A process according to claim 3, wherein the metal complex contains a chiral ligand.

6. (Previously Presented) A process according to claim 5, wherein the folic acid ester salt is of formula III and is in the form of a single enantiomer or a mixture of enantiomers of formula III,



in which

one of R_1 or R_2 is H, and the other one of R_1 or R_2 is a monovalent hydrocarbon radical or a hydrocarbon radical attached via a carbon atom in which one or more carbon atoms are each independently replaced by oxygen, sulfur, NH, -N=, or -N(C₁-C₄ Alkyl)-, or

both R_1 and R_2 independently of one another represent a monovalent hydrocarbon radical or a hydrocarbon radical attached via a carbon atom in which one or more carbon atoms are each independently replaced by oxygen, sulfur, NH, -N=, or -N(C₁-C₄ Alkyl)-,

HA stands for a monobasic to tribasic inorganic or organic acid, and

x denotes an integer from 1 to 6 or a fractional number between 0 and 6.

7. (Previously Presented) A process according to claim 6, wherein HA is unsubstituted or substituted phenylsulphonic acid.

8. (Previously Presented) A process according to claim 1, wherein said process is carried out at a hydrogen pressure of 1 to 500 bars.

9. (Previously Presented) A process according to claim 1, wherein said process is carried out at a temperature is 0 to 150⁰ C.

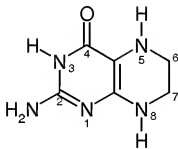
10. (Previously Presented) A process according to claim 1, wherein the molar ratio of pterin or pterin compound to catalyst is 10 to 100,000.

11. (Previously Presented) A process according to claim 1, wherein the reaction medium is water or water in admixture with an organic solvent.

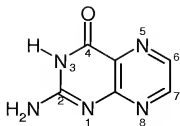
12. (Previously Presented) A process according to claim 2, wherein the alcoholic reaction medium is an alcohol, or an alcohol in admixture with an organic solvent.

13. (Previously Presented) A process according to claim 1, wherein the metal complex contains a d-8 metal.

14. (Currently Amended) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,
comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium, wherein

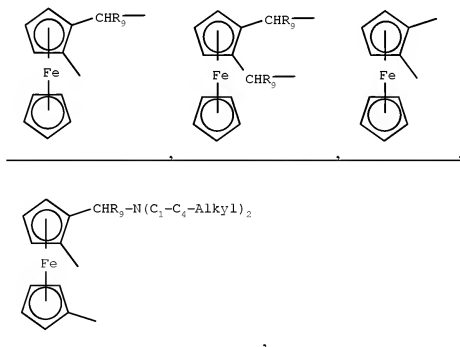
the catalyst has a ligand that is ~~an achiral or chiral ditertiary-diphosphine~~ of formula IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, XVII, XVIII, XIX, XX, XXI, XXII, XXIII, XXIV, XXV, XXVI, XXVII, XXVIII, XXIX, XXX, XXXI, XXXII, XXXIII, XXXIV, XXXV, XXXVI, XXXVII, XXXVIII, XXXIX, XL, Y1 or Y2,

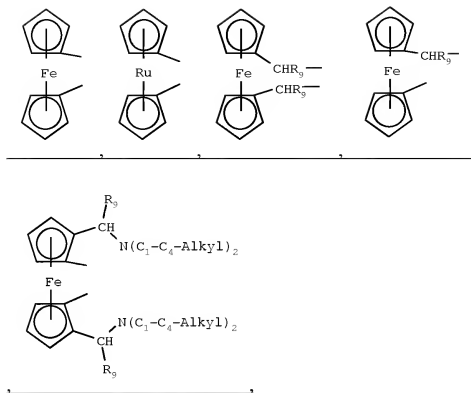


in which

R₄, R₅, R₇ and R₈ independently of one another represent a hydrocarbon radical with 1 to 20 carbon atoms which are unsubstituted or substituted with halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, (C₆H₅)₃Si-, (C₁-C₁₂-alkyl)₃Si-, -NH₂, -NH(C₁-C₁₂-alkyl), -NH(phenyl), -NH(benzyl), -N(C₁-C₁₂-alkyl)₂, -N(phenyl)₂, -N(benzyl)₂, morpholinyl, piperidinyl, pyrrolidinyl, piperazinyl, -ammonium-X₃⁻, -SO₃M₁, -CO₂M₁, -PO₃M₁, or -CO₂-C₁-C₆-alkyl, where M₁ represents an alkali metal or hydrogen, and X₃⁻ is an anion of a monobasic acid; or R₄ and R₅ and/or R₇ and R₈ together denote tetramethylene, pentamethylene or 3-oxapentane-1,5-diyl, unsubstituted or substituted with halogen, C₁-C₆-alkyl or C₁-C₆-alkoxy, and R₆ is C₂-C₄-alkylene, unsubstituted or substituted with C₁-C₆-alkyl, C₁-C₆-alkoxy, C₅-cycloalkyl or C₆-cycloalkyl, phenyl, naphthyl or benzyl; 1,2- or 1,3-cycloalkylene, 1,2- or 1,3-

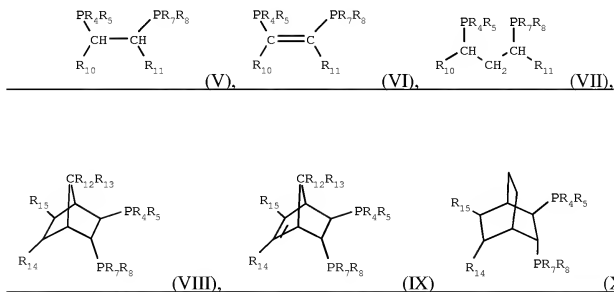
cycloalkenylene, 1,2- or 1,3-bicycloalkylene or 1,2- or 1,3-bicycloalkenylene with 4 to 10 carbon atoms, unsubstituted or substituted with C_1 - C_6 -alkyl, phenyl or benzyl; 1,2- or 1,3-cycloalkylene, 1,2- or 1,3-cycloalkenylene, 1,2- or 1,3-bicycloalkylene or 1,2- or 1,3-bicycloalkenylene with 4 to 10 carbon atoms, unsubstituted or substituted with C_1 - C_6 -alkyl, phenyl or benzyl, and attached at whose 1- and/or 2-position(s) or at whose 3-position is methylene or C_2 - C_4 -alkylidene; 1,4-butylenylene, substituted in the 2,3-positions with R_9 - $R_{10}C(O-)_2$, and in the 1- and/or 4-positions unsubstituted or substituted with C_1 - C_6 -alkyl, phenyl or benzyl, and where R_9 and R_{10} independently of one another represent hydrogen, C_1 - C_6 -alkyl, phenyl or benzyl; 3,4- or 2,4-pyrrolidinylene or methylene-4-pyrrolidine-4-yl, the N-Atom of which is substituted with hydrogen, C_1 - C_{12} -alkyl, phenyl, benzyl, C_1 - C_{12} -alkoxycarbonyl, C_1 - C_8 -acyl, C_1 - C_{12} -alkylamino carbonyl; or 1,2-phenylene, 2-benzylene, 1,2-xylylene, 1,8-naphthylene, 2,2'-dinaphthylene or 2,2'-diphenylene, unsubstituted or substituted with halogen, -OH, C_1 - C_6 -alkyl, C_1 - C_6 -alkoxy, phenyl, benzyl, phenyloxy or benzyloxy; or R_6 stands for a radical of one of the following formulas

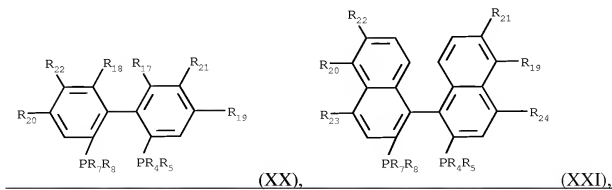
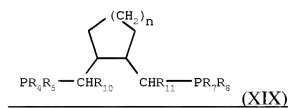
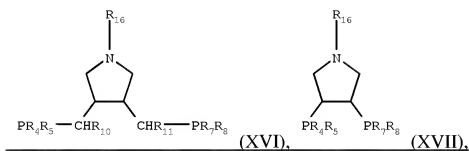
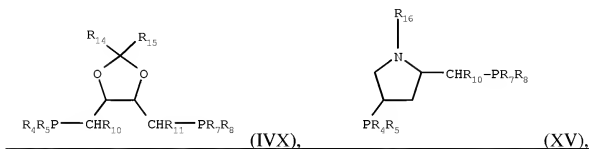
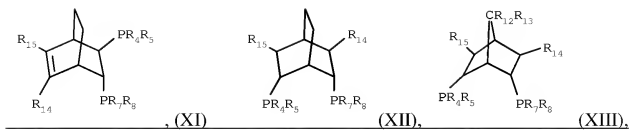


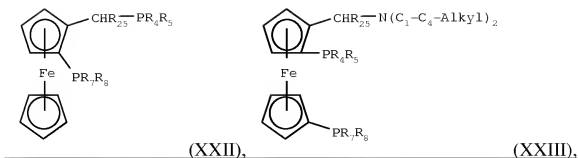


in which

R_9 denotes hydrogen, C_1 - C_8 -alkyl, C_1 - C_4 -fluoroalkyl, unsubstituted phenyl or phenyl substituted with 1 to 3 F, Cl, Br, C_1 - C_4 -alkyl, C_1 - C_4 -alkoxy or fluoromethyl;







in which

R₄, R₅, R₇ and R₈ have the meanings as recited above.

R₁₀ and R₁₁ independently of one another denote hydrogen, C₁-C₄ alkyl or benzyl or phenyl, unsubstituted or substituted with one to three C₁-C₄ alkyl or C₁-C₄ alkoxy,

R₁₂ and R₁₃ independently of one another represent hydrogen, C₁-C₄ alkyl, phenyl or benzyl,

R₁₄ and R₁₅ independently of one another denote hydrogen, C₁-C₄ alkyl, C₁-C₄ alkoxy, or benzyl or phenyl, unsubstituted or substituted with one to three C₁-C₄ alkyl or C₁-C₄ alkoxy,

R₁₆ represents hydrogen, C₁-C₁₂ alkyl, unsubstituted benzyl or phenyl, or benzyl or phenyl substituted with one to three C₁-C₄ alkyl or C₁-C₄ alkoxy, C₁-C₁₂ alkoxy-C(O)-, unsubstituted phenyl-C(O)- or benzyl-C(O)-, or phenyl-C(O)- or benzyl-C(O)- substituted with one to three C₁-C₄ alkyl or C₁-C₄ alkoxy, C₁-C₁₂ alkyl-NH-CO-, or phenyl-NH-C(O)- or benzyl-NH-C(O)-, unsubstituted or substituted with one to three C₁-C₄ alkyl or C₁-C₄ alkoxy,

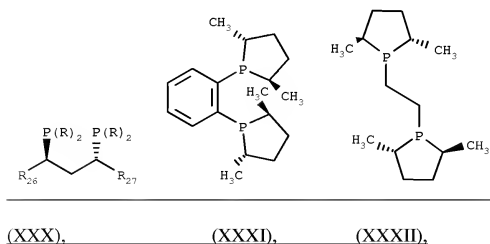
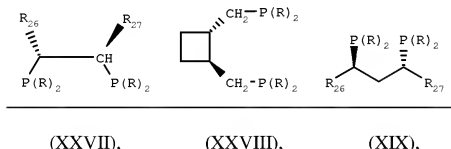
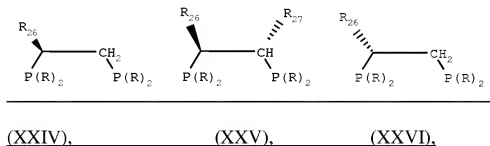
n stands for 0, 1 or 2,

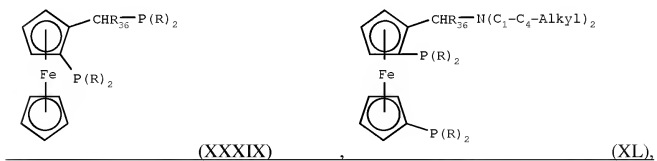
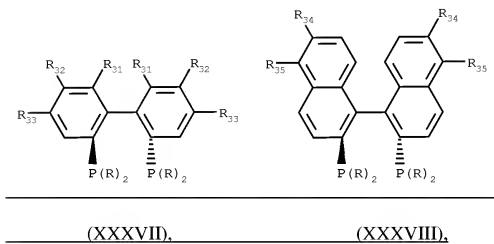
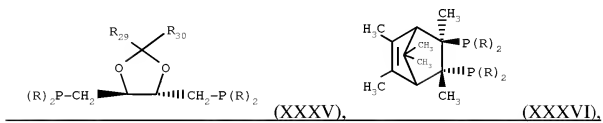
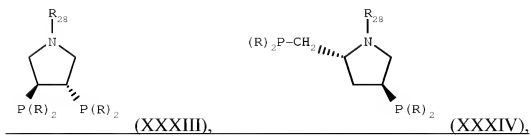
R₁₇ and R₁₈ are C₁-C₄ alkyl or C₁-C₄ alkoxy, or R₁₇ and R₁₈ together denote oxadimethylene,

R₁₉, R₂₀, R₂₁, R₂₂, R₂₃ and R₂₄ are independently of one another H, C₁-C₄ alkyl, C₁-C₄ alkoxy, C₅- or C₆ cycloalkyl or C₅- or C₆ cycloalkoxy, phenyl, benzyl, phenoxy, benzyloxy,

halogen, OH, $-(CH_2)_3-C(O)-O-C_1-C_4$ alkyl, $-(CH_2)_3-C(O)-N(C_1-C_4-alkyl)_2$ or $-N(C_1-C_3-alkyl)_2$,
or R_{19} and R_{21} , and/or R_{17} and R_{21} , and/or R_{20} and R_{22} , and/or R_{18} and R_{22} , or R_{21} and R_{23} and/or
 R_{22} and R_{24} together represent a fused-on 5 or 6-membered, monocyclic or bicyclic hydrocarbon
ring, and

R_{25} is C_1-C_4 alkyl;





in which

R stands for cyclohexyl or unsubstituted phenyl or phenyl substituted with one to three C₁-C₄-alkyl, C₁-C₄-alkoxy, trifluoromethyl, or an -NH₂ (C₁-C₄-alkyl)NH-, (C₁-C₄-alkyl)₂N-,

R₂₆ and R₂₇ independently of one another denote C₁-C₄-alkyl, phenyl or benzyl,

R₂₈ represents C₁-C₈-alkyl, C₁-C₈-acyl or C₁-C₈-alkoxycarbonyl,

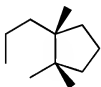
R₂₉ stands for hydrogen, C₁-C₄-alkyl, phenyl or benzyl,

R₃₀ represents C₁-C₄-alkyl, phenyl or benzyl,

R₃₁ denotes methyl, methoxy, or both R₃₁ together denote oxadimethylene,

R₃₂ and R₃₃ independently of one another represent H, C₁-C₄-alkyl, C₁-C₄-alkoxy or (C₁-C₄-alkyl)₂N-,

R₃₄ and R₃₅ independently of one another represent H, C₁-C₄-alkyl, C₁-C₄-alkoxy, -(CH₂)₃-C(O)-O-C₁-C₄-alkyl, -(CH₂)₃-C(O)-N(C₁-C₄-alkyl)₂ or one pair R₃₄ and R₃₅ together represents a radical of formula XLI and the other pair R₃₄ and R₃₅ together represents a radical of formula XLII



(XLI),

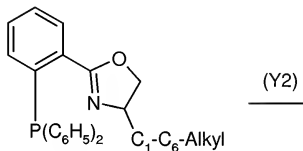
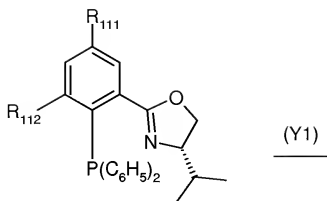


(XLII),

and

R₃₆ stands for C₁-C₄-alkyl,

or a compound of the following formulae



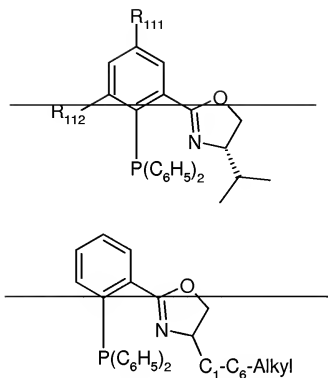
wherein R_{111} and R_{112} are each independently H or methyl;

wherein

a) —the reaction medium is an alcoholic reaction medium, and wherein in the diphosphine the phosphine groups are attached (a) to various carbon atoms of a hydrocarbon chain having 2 to 4 carbon atoms, or (b) directly or via a bridging group $-CR_aR_b-$ in the ortho positions of a cyclopentadienyl ring or to a cyclopentadienyl ring of a ferrocenyl, wherein R_a and R_b are the same or different and stand for H, C_1-C_8 alkyl, C_1-C_4 fluoroalkyl, C_5-C_6 cycloalkyl, phenyl, benzyl, or phenyl or benzyl substituted with 1 to 3 C_1-C_4 alkyl or C_1-C_4 alkoxy;

or

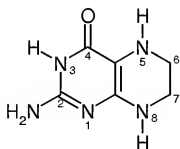
b) —the catalyst has a ligand that is a compound of one of the the following formulae



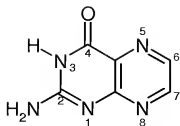
wherein R_{111} and R_{112} are each independently H or methyl.

15-28. (Cancelled)

29. (Previously Presented) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,
comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in alcohol or in alcohol in admixture with an organic solvent in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium.

30-32. (Cancelled)

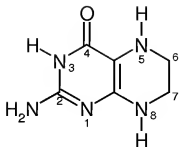
33. (Previously Presented) A process according to claim 3, wherein the hydrogenation is carried out at elevated pressure.

34. (Previously Presented) A process according to claim 1, wherein the metal complex contains iridium, rhodium or ruthenium.

35-36. (Cancelled)

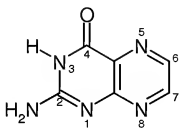
37-39. (Cancelled)

40. (Previously Presented) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,

comprising hydrogenating pterin of the following formula



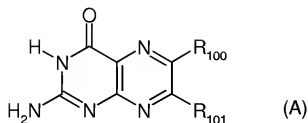
or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,

with hydrogen in alcohol or in alcohol in admixture with an organic solvent in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium, wherein the pterin compound is folic acid, a folic acid salt, a folic acid ester, a folic acid ester salt or a dihydro form thereof, with the proviso that in the event of using folic acid, a carboxylic acid thereof or a dihydro form thereof, the reaction medium is aqueous, and in the event of using a folic acid ester, a folic acid ester salt or a dihydro form thereof, the reaction medium is an alcohol.

41-44. (Cancelled)

45. (Currently Amended) A process according to claim 1, wherein the pterin compound is a pterin that is substituted in the 6- position ~~and/or 7- positions~~.

46. (Currently Amended) A process according to claim 1, wherein the pterin compound is of formula (A)



in which

R_{101} is H or independently has the meaning of R_{100} , and

R_{100} is an organic radical attached via a C, O or N atom and having 1 to 50 carbon atoms;

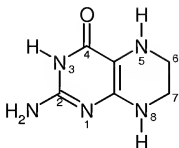
~~M_{100} is Li, K, Na, NH_4^+ , or ammonium with 1 to 16 carbon atoms;~~

~~R_{102} is C_1 - C_8 -alkyl, C_5 - or C_6 -cycloalkyl, phenyl or benzyl, and~~

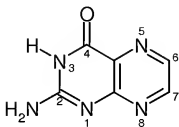
~~R_{103} is C_1 - C_4 -alkyl, phenyl or benzyl.~~

47. (Currently Amended) A process according to claim 46, wherein R_{100} contains 1 to 30 carbon atoms and is not interrupted or is interrupted by one or more of -O-, -NH-, -N(C_1 - C_4 -alkyl)-, -C(O)-, -C(O)O-, -OC(O)-, -OC(O)O-, -C(O)NH-, -NHC(O)-, -NHC(O)O-, -OC(O)NH-, -NHC(O)NH-, -C(O)N(C_1 - C_4 -alkyl)-, -N(C_1 - C_4 -alkyl)C(O)-, -N(C_1 - C_4 -alkyl)C(O)O-, -OC(O)N(C_1 - C_4 -alkyl)-, -N(C_1 - C_4 -alkyl)C(O)N(C_1 - C_4 -alkyl)-, and which is unsubstituted or is substituted with F, Cl, Br, -CN, -OCN, -NCO, -OH, -NH₂, -NHC(C_1 - C_4 -alkyl), -N(C_1 - C_4 -alkyl)₂, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -hydroxyalkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy, -C(O)OH, -C(O)OM₁₀₀, -C(O)OC(C_1 - C_4 -alkyl), -C(O)NH₂, -C(O)NHC(C_1 - C_4 -alkyl), -C(O)N(C_1 - C_4 -alkyl)₂, R_{102} -C(O)O-, R_{102} -OC(O)O-, R_{102} -C(O)NH-, R_{102} -C(O)N(C_1 - C_4 -alkyl)-, R_{102} -NHC(O)NH-, R_{103} C(O)- or -CH(O)_x wherein
 ~~M_{100} is Li, K, Na, NH_4^+ , or ammonium with 1 to 16 carbon atoms,~~
 ~~R_{102} is C_1 - C_8 -alkyl, C_5 - or C_6 -cycloalkyl, phenyl or benzyl, and~~
 ~~R_{103} is C_1 - C_4 -alkyl, phenyl or benzyl.~~

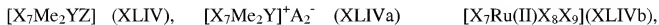
48. (Currently Amended) A process for preparing tetrahydropterin of the following formula



or a tetrahydropterin compound of said tetrahydropterin that is substituted at the 6-, or 7- or 6- and 7- position or positions,
comprising hydrogenating pterin of the following formula



or a pterin compound of said pterin that is monosubstituted at the 6-, or 7- or 6- and 7- position or positions,
with hydrogen in a polar reaction medium in the presence of a hydrogenation catalyst that is a metal complex that is soluble in the reaction medium of formula XLIV, XLIVa or XLIVb,



in which

Y stands for monoolefin ligands or a diene ligand;

X_7 represents an achiral or chiral ditertiary diphosphine, that forms a 5 to 7 membered ring with the metal atom Me_2 or Ru;

X_7 represents an achiral or chiral ~~ditertiary diphosphine, ligand~~ that forms a 5 to 7 membered ring with the metal atom Me_2 or Ru_2 , wherein said ligand contains two tertiary phosphine groups;

Me_2 denotes Ir(I) or Rh(I);

Z represents $-Cl$, $-Br$, or $-I$; and

A_2 is ClO_4^- , $CF_3SO_3^-$, $CH_3SO_3^-$, HSO_4^- , BF_4^- , $B(Phenyl)_4^-$, PF_6^- , $SbCl_6^-$, AsF_6^- or SbF_6^- ;

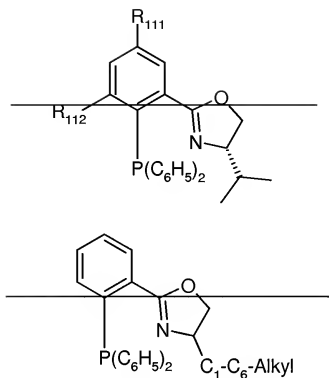
X_8 and X_9 are the same or different and have the meaning of Z or A_2 , or X_8 has the meaning of Z or A_2 and X_9 stands for hydride.

49. (Previously Presented) A process according to claim 6, wherein R_1 and/or R_2 are, each independently,

pyrrolidinyl, piperidinyl, morpholinyl, tetrahydropyranyl, piperazinyl, pyrrolidinyl methyl, pyrrolidinyl ethyl, piperidinyl methyl, piperidinyl ethyl, morpholinyl methyl, morpholinyl ethyl, tetrahydropyranyl methyl, tetrahydropyranyl ethyl, piperazinyl methyl or piperazinyl ethyl.

50. (Cancelled)

51. (Currently Amended) A process according to claim 14, wherein the catalyst has a ligand that is of formula Y1 or Y2 ~~a compound of one of the the following formulae~~



wherein R₁₁₁ and R₁₁₂ are each independently H or methyl.

52. (New) A process according to claim 14, wherein the reaction medium is an alcoholic reaction medium.

53. (New) A process according to claim 14, wherein the reaction medium is an aqueous reaction medium.

54. (New) A process according to claim 14, wherein the catalyst has a ligand that contains one or more water-solubilising polar substituents.

55. (New) A process according to claim 14, wherein the catalyst has a ligand that is of formula IV.

56. (New) A process according to claim 14, wherein the catalyst has a ligand that is of formula V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, XVII, XVIII, XIX, XX, XXI, XXII or XXIII.

57. (New) A process according to claim 14, wherein the catalyst has a ligand that is of formula XXIV, XXV, XXVI, XXVII, XXVIII, XXIX, XXX, XXXI, XXXII, XXXIII, XXXIV, XXXV, XXXVI, XXXVII, XXXVIII, XXXIX, or XL.